

## NOTES ON THE GENUS *EUPHRANTA* LOEW (DIPTERA: TEPHRITIDAE), WITH DESCRIPTION OF FOUR NEW SPECIES

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### Abstract

*Euphranta betikamae* sp. n., *E. fuscata* sp. n. and *E. isabellae* sp. n. are described from the Solomon Archipelago and *E. sabahensis* sp. n. is described from Sabah, East Malaysia. Four new synonymies are proposed: *E. maculifemur* (de Meijere) [= *E. flavizona* Hardy, syn. n.]; *E. notabilis* (van der Wulp), comb. n. [= *E. canangae* Hardy, syn. n.]; *E. rudis* (Walker) [= *E. balteata* Hardy, syn. n.]; *E. zeylanica* (Senior-White) [= *E. conjuncta* Hendel, syn. n.]. *Paraeuphranta* Hardy is newly synonymised with *Euphranta* Loew and *E. furcifer* (Walker), comb. n. is transferred. New country records are provided for *E. apicalis* Hendel, *E. corticicola* (Hering), *E. lemniscoides* Hancock & Drew, *E. macularis* (Wiedemann), *E. notabilis* (van der Wulp), *E. meringae* Permkam & Hancock and *E. solitaria* Hardy. The 102 described species are placed in 20 groups and a list of known host plants is provided.

### Introduction

The genus *Euphranta* Loew contains over 100 species of fruit flies belonging to the trypetine tribe Adramini. They are primarily Indo-Australian, with only two species reaching Europe and two occurring in North America. Surprisingly, the genus has not been reported from Sulawesi. With very few exceptions the species are monophagous and breed almost exclusively in fruit. They are difficult to collect unless bred and most are poorly represented in collections. Australasian species were revised by Hardy (1983) and Permkam and Hancock (1995), with additional records provided by Hancock and Drew (1994, 1995, 2003), Chua and Hancock (1999), Chua (2000, 2002) and Norrbom and Hancock (2004). More recently, a small but interesting collection was sent to us from the University of Hawaii, containing four undescribed species. These had been provisionally sorted and studied by the late D. Elmo Hardy.

Prior to studying these new species, we undertook a review of the genus. As a result, we detected two generically misplaced species plus one generic and four new specific synonymies. We also found that the recognition of subgenera on setal characteristics was untenable, confirming the view of Permkam and Hancock (1995). Thus, *Paraeuphranta* Hardy, syn. n., *Rhacochlaena* Loew and *Xanthotrypeta* Malloch are placed in synonymy with *Euphranta*, with no subgenera recognised. The 102 accepted species are placed here as far as possible into species groups. The two generically misplaced species, *E. luteifasciata* (Senior-White) from Sri Lanka and *E. bifasciata* Hardy from Malaysia, will be referred to separate genera by Hancock and Drew (in press).

The following collection acronyms have been used: ANIC - Australian National Insect Collection, Canberra; BMNH - The Natural History Museum,

London; BPBM - Bernice P. Bishop Museum, Honolulu; CAS - California Academy of Sciences, San Francisco; MHNG - Museum d'Histoire Naturelle, Geneva; UH - University of Hawaii, Honolulu.

### Systematics

#### *Euphranta apicalis* Hendel

*Material examined.* INDONESIA: 1 ♂, Siantar, Sumatra, xii.1963, Otto-Surbeck (MHNG).

*Comments.* This widespread South East Asian species is newly recorded from Indonesia.

#### *Euphranta betikamae* sp. n.

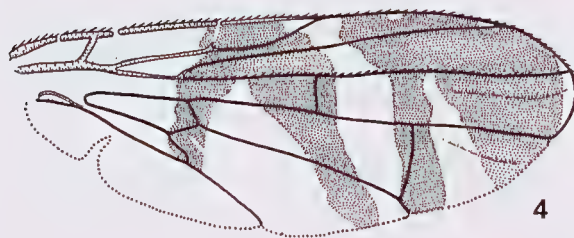
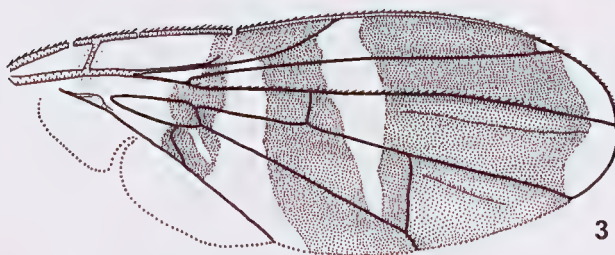
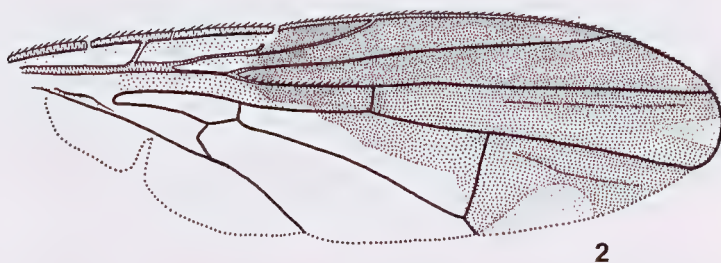
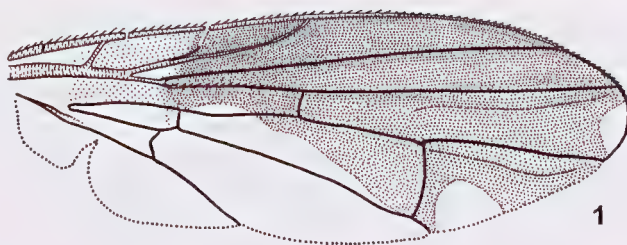
(Fig. 1)

*Types.* *Holotype* ♂, SOLOMON ISLANDS: Guadalcanal, Betikama R., viii.1960, W.W. Brandt (BPBM). *Paratype* ♀, [New Georgia group], Vella Lavella, Ulo Crater, 10 m, xii.1963, malaise trap (BPBM).

*Description.* Male. Length of body, 6.5 mm; of wing, 5.5 mm. Head slightly higher than long. Antennae abraded in type. Face concave, yellow except brown along oral margin. Frons fulvous laterally, broadly fuscous medially; pale pubescent; with 2 pairs of frontal and 1 pair of orbital setae, the frontal setae widely separated with the upper pair just before the orbitals; ocellar setae absent. Occiput largely black behind eyes, fulvous dorsomedially; postocellar setae present.

Thorax mostly black with greyish tomentosity; proepisternum largely fulvous; posterior half of postpronotal lobe, notopleural callus and along suture yellow; anterior half of postpronotal lobe brown; anepisternum with a yellow posterior band as wide as notopleural callus and overlaid with grey tomentosity; scutum with a broad, yellow prescutellar marking, bordered by dorsocentral setae and bluntly pointed anteriorly. Scutellum blackish-brown on disc, yellow marginally; subscutellum and mediotergite black. With a full complement of thoracic setae except presuturals and prescutellar acrostichals; dorsocentrals placed midway between supra-alars and scutellum; 1 anepisternal; 4 scutellars. Haltere orange. Legs with fore femur fulvous with a subapical brown band, fore tibiae brownish; mid and hind femora and tibiae largely blackish-brown and tarsi dark fulvous; middle tibia with an apical black spine.

Wing (Fig. 1) with a large, blackish-brown apical area, from pterostigma to vein M at base of cell dm, diagonally crossing cell dm from R-M to wing margin at apex of vein Cu<sub>1</sub>, leaving apex of cell r<sub>4+5</sub> with a whitish spot not reaching vein R<sub>4+5</sub>; cell m with a distinct hyaline indentation posteriorly; cell c and basal part of cell br pale fuscous; cell cu<sub>2</sub> entirely hyaline. Pterostigma blackish-brown. Veins R<sub>1</sub> and basal quarter of R<sub>4+5</sub> setose; R-M crossvein near middle of cell dm, below apex of pterostigma; cell bcu apically acute.



Figs 1-4. *Euphranta* spp., wings. (1) *E. betikamae* sp. n., male; (2) *E. fuscata* sp. n., male; (3) *E. isabellae* sp. n., female; (4) *E. sabahensis* sp. n., female.

Abdomen elongate, broadest at tergite III; black except terga I+II and III with a quadrate orange medial area. Tergite V a little longer than tergite IV.

Female. As for male except face brown with a narrow yellow area below antennal bases; antennae orange, shorter than face, with third segment apically rounded and arista plumose; scutellum blackish-brown; abdomen elongate with all terga black and tergite VI about 0.7 times as long as tergite V; oviscapae brownish-black, as long as terga IV-VI combined.

*Etymology.* Named after the type locality, Betikama River.

*Distribution.* Known from Guadalcanal and the New Georgia group, western Solomon Islands.

*Comments.* This species appears to belong in the *scutellata* group, closest to *E. vitabilis* Hardy from the Bismarck Archipelago and *E. fuscata* sp. n. from Bougainville and Santa Isabel. It differs from *E. vitabilis* in lacking the broad hyaline indentation on the wing beyond the pterostigma and from *E. fuscata* in the well defined hyaline indentations in wing cells  $r_{4+5}$  and m.

*Euphranta corticicola* (Hering)

*Material examined.* SINGAPORE: 1 ♂, H.N. Ridley, 1900-242 (BMNH). INDIA: 6 ♂♂, 2 ♀♀, Haldwani Div., Uttar Pradesh, 11.iii.1923, R.N. Parker, ex *Dysoxylum binectariferum* fruits (BMNH).

*Comments.* This species, placed in the *camelliae* group, is newly recorded from India and Singapore. Indian specimens differ from those from Singapore and Java (see Hardy 1983) in having brown facial spots and the wing bands more distinctly curved. Thailand specimens are intermediate (Hardy 1983, Hancock and Drew 1994) and more information is required (particularly host plant data for non-Indian populations) in order to determine if a complex of species is involved. All have the characteristic fuscous tibiae, a character separating *E. corticicola* from the Japanese *E. separata* (Ito), which has yellow tibiae. The latter is sometimes regarded as a synonym of *E. oshimensis* (Shiraki) but has a narrower apical hyaline spot on the wing and a yellow, posteriorly expanded medial band on the scutum. Indian specimens were bred from the fruit of *Dysoxylum binectariferum* (Meliaceae).

*Euphranta furcifer* (Walker), comb. n.

*Material examined.* INDONESIA: Lectotype ♂, Gilolo [Maluku], W.W. Saunders, BM 1868-4 (BMNH).

*Comments.* *Dacus furcifer* Walker is transferred from *Paraeuphranta* Hardy, placed here as a new synonym of *Euphranta*. It is placed in the *macularis* group, characterised by the wing pattern, very short pterostigma and slender abdomen. The presence of a few fore femoral spines was used by Hardy (1959) to define *Paraeuphranta*, but these also occur in *E. macularis* (Wiedemann) (Hardy 1974). *E. furcifer* is known only from the northern Moluccas, Indonesia.



*Euphranta fuscata* sp. n.

(Fig. 2)

*Types.* *Holotype* ♂, SOLOMON ISLANDS: Santa Ysabel, Molao, Maringe Dist., 30.vi.1960, C.W. O'Brien (BPBM). *Paratypes*: 1 ♂, Santa Ysabel, Sukapisu, 900 m, 18.vi.1960, C.W. O'Brien (BPBM); 1 ♂, Solomon Isl., vii-viii.1909, Froggatt (ANIC). PAPUA NEW GUINEA: 1 ♂, Solomon Is. [*sic*], Bougainville I., Konga, ii-iii.1961, W.W. Brandt (ANIC).

*Description.* Male. Length of body, 6.5 mm; of wing, 5.5 mm. Head as for *E. betikamae* except face with lower two-thirds brown and antennae orange, shorter than face, with third segment apically rounded and arista plumose. Thorax and legs as for *E. betikamae* except scutellum with or without yellow margin and posterior half of postpronotal lobe, notopleural callus and suture with yellow markings less distinct, tending yellow-brown. Wing (Fig. 2) as for *E. betikamae* except more elongate, with brown area in cell dm narrower apically and hyaline indentations in cells  $r_{4+5}$  and m less distinct, being diffuse or virtually absent. Abdomen as for *E. betikamae* except orange medial band often extends to tergite IV.

Female. Unknown.

*Etymology.* The name *fuscata* is derived from the mostly dark wing.

*Distribution.* Known from Bougainville, Papua New Guinea and Santa Isabel, eastern Solomon Islands.

*Comments.* This species appears to belong in the *scutellata* group, closest to *E. betikamae* sp. n. from the western Solomon Is and differing primarily in the more elongate wing with diffuse rather than distinct hyaline indentations in cells  $r_{4+5}$  and m.

*Euphranta isabellae* sp. n.

(Fig. 3)

*Types.* *Holotype* ♀, SOLOMON ISLANDS: Santa Ysabel, SE, Tatamba, 0-50 m, 7.ix.1964, R. Straatman, malaise trap (BPBM). *Paratype* ♀, same data but 14.ix.1964 (BPBM).

*Description.* Female. Length of body (excluding oviscap), 6 mm; of wing, 5.5 mm. Head as for *E. betikamae* except face yellow, frons fulvous laterally, broadly brown medially and occiput fulvous, darker behind eyes.

Thorax with scutum red-brown, darker medially; pleura mostly fulvous, tending red-brown on lower part of anepisternum and katepisternum red-brown to fuscous; postpronotal lobe, notopleural callus, along suture and a band across anterior notopleural seta connecting postpronotal lobe and notopleural callus yellow; scutum with a broad, quadrate, yellow prescutellar marking bordered at anterior corners by dorsocentral setae, reaching hind margin of scutum and united posteriorly with a pair of lateral postsutural yellow vittae. Scutellum yellow. Subscutellum and mediotergite fuscous.

With a full complement of thoracic setae except presuturals; prescutellar acrostichals present; dorsocentrals placed a little behind line of supra-alars; 2 anepisternals; 4 scutellars. Haltere fulvous. Legs mostly fulvous, fore tibiae browner; apical quarter of mid and hind femora and mid and hind tibiae brown; middle tibia with an apical black spine.

Wing (Fig. 3) with three brown transverse bands, one from apex of cell c and base of pterostigma to base of cell  $cu_2$ ; one from apical three-fifths of pterostigma across R-M crossvein and cell dm to wing margin over apical half of cell  $cu_2$ ; and one broad subapical band leaving apices of cells  $r_1$  at posterior tip,  $r_{2+3}$  and  $r_{4+5}$  broadly and m at extreme anterior tip hyaline; this band connected to previous band in cell  $cu_2$ , leaving an incomplete, narrow, triangular indentation between them from costa at apex of pterostigma to vein  $Cu_1$  near posterior apex of cell dm. Pterostigma blackish-brown; base of cell c and just below it brownish. Veins  $R_1$  and most of  $R_{4+5}$  setose; R-M crossvein near middle of cell dm, below apex of pterostigma; cell  $bcu$  apically acute.

Abdomen elongate, fuscous except terga I+II medially and most of tergite VI red-brown. Tergite VI about 0.8 times length of tergite V. Oviscape conical, red-brown, about as long as terga V and VI combined.

Male. Unknown.

*Etymology.* Named after the island of Santa Isabel.

*Distribution.* Known only from Santa Isabel, eastern Solomon Islands.

*Comments.* This species belongs in the *crux* group, close to *E. bischofi* (Kertész) from Papua New Guinea and *E. minor* Hendel from Australia. It differs from both these species in the more extensive yellow prescutellar patch on the scutum, the intermediate length of the hyaline indentation beyond the pterostigma and the lack of a subapical hyaline indentation in wing cell  $r_1$ .

#### *Euphranta laosica* Hardy

*Material examined.* MALAYSIA: 1 ♂, Johor, Keluang, 28.x.1981, Salasiah (BMNH).

*Comments.* The male was previously unrecorded. The abdomen has tergite III mostly fulvous with a broad black basomedial area. The anepisternum has three setae (one medial and two posterior), typical of the *zeylanica* group to which it is referred.

#### *Euphranta lemniscoides* Hancock & Drew

*Material examined.* SOLOMON ISLANDS: 1 ♂, New Georgia group, Kolombangara I., Pepele, 30 m, 10.ii.1964, P. Shanahan (BPBM). PAPUA NEW GUINEA: 1 ♀, New Britain, Mt Sinewit, 3500', 27.vi.-17.ix.1963, W.W. Brandt (ANIC); 1 ♂, Nissan group, Green I., 2.iv.1961, W. Brandt (ANIC).

*Comments.* Described from Guadalcanal (Hancock and Drew 2003), this species is newly recorded from the New Georgia group and from the

Bismarck Archipelago, Papua New Guinea. The female oviscapae is dark red-brown to black and elongate, a little longer than the rest of the abdomen.

*Euphranta macularis* (Wiedemann)

*Material examined.* MALAYSIA: 1 ♂, Perak, Batang Padang, Kuala Woh, 22.iii.1940; 1 ♂, Pahang, Fraser's Hill, 4200 ft, 21.vii.1936 (both BMNH).

*Comments.* This species is newly recorded from Peninsular Malaysia.

*Euphranta maculifemur* (de Meijere)

*Material examined.* INDONESIA: 1 ♂, Sumatra, Sumatera Barat, 15 km E of Padang, forested foothills, 25.vii.1983, E.S. Ross (CAS).

*Comments.* This species was confused in the literature until its identity was clarified by Hancock and Drew (1994). The male was previously unrecorded. The above specimen has distinct subapical dark markings on all femora, no expansion of the fore basitarsus and weak prescutellar acrostichal setae. *Euphranta flavizona* Hardy, 1983, differs only in the apparent absence of these acrostichal setae and is placed as a new synonym of *E. maculifemur* (de Meijere, 1924). It occurs in Sumatra, Java, Peninsular Malaysia and Sarawak.

*Euphranta marina* Permkam & Hancock

*Material examined.* PAPUA NEW GUINEA: 1 ♂, Central Province, Yule Island, 14.iv.1974, J.P. Spradbury (ANIC); 1 ♀, Central Province, Gaba Gaba, 20.v.1984, J.W. Ismay (UH).

*Comments.* This mangrove inhabiting species is newly recorded from Central Province.

*Euphranta meringae* Permkam & Hancock

*Material examined.* SOLOMON ISLANDS: 1 ♂, Guadalcanal, Honiara, 0-100 m, xii.1974, N.L.H. Krauss (BPBM).

*Comments.* This species is newly recorded from Solomon Islands. It belongs in the *zeylanica* group. The above male shows slight differences in the wing pattern from the holotype female from northern Queensland (Permkam and Hancock 1995) but, at least until further material becomes available, they are regarded as conspecific.

*Euphranta notabilis* (van der Wulp), comb. n.

*Material examined.* INDIA: 1 ♀, Pirmed, 3400 ft, Travancore, 4-6.v.1937, BM-CM Expedn to South India, April-May 1937 (BMNH).

*Comments.* *Euphranta canangae* Hardy, 1955, is placed as a new synonym of *E. notabilis* (van der Wulp, 1880). Originally described in *Ptilona* van der Wulp, *E. notabilis* was included in *Acanthonevra* Macquart by Hardy (1986). It has the three anepisternal setae (one medial and two posterior) typical of the *zeylanica* group. Known previously from the Philippines, West Malaysia, Sumatra and Java, it is newly recorded from India.

*Euphranta rudis* (Walker)

*Material examined.* MALAYSIA: Lectotype ♀, Sarawak, Borneo, W.W. Saunders, BM 1868-4; 1 ♀, Pahang, Cameron Highlands, Ginling Kial, 5000 ft, 24.v.1939, H.M. Pendlebury (both BMNH).

*Comments.* *Euphranta balteata* Hardy, 1981, is placed as a new synonym of *E. rudis* (Walker, 1856). Although Hardy (1983) regarded *E. rudis* as a *nomen dubium*, its known characters (Hardy 1959), plus the above specimen from Pahang, clearly ally it with *E. balteata*, also described from East Malaysia (Hardy 1981). It belongs in the *linocierae* group and is known from both West and East Malaysia (Sarawak and Sabah) and Brunei Darussalam (Chua 2002).

*Euphranta sabahensis* sp. n.

(Fig. 4)

*Type. Holotype* ♀, EAST MALAYSIA: North Borneo [Sabah], (SE), Forest Camp, 19 km N of Kalabakan, 17.xi.1962, K.J. Kuncheria (BPBM).

*Description.* Female. Length of body (excluding oviscapae), 4.6 mm; of wing, 4.2 mm. Head as for *E. betikamae* except face fulvous, frons fulvous laterally, broadly red-brown medially, antennae red-brown and occiput red-brown behind eyes; 3 pairs of frontal setae, the upper pair not close to orbital setae but closer to them than to middle pair of frontals.

Thorax red-brown, tending fulvous posteromedially on scutum; postpronotal lobe fulvous. Scutellum yellow with a broad brown basal band. With a full complement of thoracic setae except presuturals; prescutellar acrostichals present; dorsocentrals placed a little behind line of supra-alars; 2 anepisternals, the lower weak; 4 scutellars. Haltere dark fulvous. Legs dark fulvous with tibiae tending brownish; middle tibia with an apical black spine.

Wing (Fig. 4) with brown markings as follows: a narrow transverse band from apex of cell c and basal half of pterostigma to base of cell cu<sub>2</sub>, united above vein R<sub>4+5</sub> below middle of pterostigma with an oblique band from apical half of pterostigma across R-M crossvein and cell dm to wing margin, broadened anteriorly and leaving apex of cell cu<sub>2</sub> hyaline; this band separated from a large brown subapical area by a narrow hyaline band crossing wing from costa at apex of pterostigma to apex of cell cu<sub>2</sub>; this subapical brown area interrupted by two small hyaline marginal spots in cell r<sub>1</sub> at middle and apex and a narrow triangular hyaline indentation across cells m and r<sub>4+5</sub> from hind margin of wing to vein R<sub>4+5</sub>, the latter resulting in a narrow brown band across DM-Cu crossvein; posterior tip of cell r<sub>2+3</sub> and entire apex of cell r<sub>4+5</sub> narrowly hyaline. Pterostigma blackish-brown except extreme apex hyaline. Veins R<sub>1</sub> and basal half of R<sub>4+5</sub> setose; R-M crossvein a little beyond middle of cell dm and beyond apex of pterostigma; cell bcu apically acute.



Abdomen elongate, red brown, tending fuscous laterally. Tergite VI about 0.7 times length of tergite V. Oviscape red-brown, about as long as terga IV and V combined.

Male. Unknown.

*Etymology.* Named after the Malaysian province of Sabah.

*Distribution.* Known only from Sabah, East Malaysia.

*Comments.* This species belongs in the *camelliae* group, the anteriorly broadened medial brown band on the wing placing it close to *E. hainanensis* (Zia) from Hainan, China. It differs from *E. hainanensis* in the broader, less parallel-sided hyaline band across the wing between the medial and subapical brown areas and shorter, more triangular indentation in cells m and  $r_{4+5}$ .

*Euphranta solitaria* Hardy

*Material examined.* SOLOMON ISLANDS: 1 ♂, New Georgia group, Kolombangara, Gollifer's Camp, 700 m, 23.i.1964, P. Shanahan, malaise trap (BPBM).

*Comments.* This species belongs in the *linocierae* group and is newly recorded from Solomon Islands. The above specimen differs from the holotype from Bougainville, Papua New Guinea (Hardy 1983) in having the wing with a slightly larger hyaline apex and more extensive brown areas basoposteriorly. Further material may show that two species are involved.

*Euphranta variabilis* (Kerétsz)

*Material examined.* PAPUA NEW GUINEA: 1 ♂, Western Province, Oriomo Govt. Station, 26-28.x.1960, J.L. Gressitt (BPBM).

*Comments.* This species belongs in the *basalis* group and appears to be widespread in New Guinea and northern Queensland.

*Euphranta zeylanica* (Senior-White)

*Material examined.* SRI LANKA: Holotype ♀, Suduganga, 30.iii.1919, R. Senior-White, on scrub, BM 1924-100 (BMNH).

*Comments.* *Euphranta conjuncta* Hendel, 1928, is placed as a new synonym of *E. zeylanica* (Senior-White, 1921). The wing pattern and elongate oviscape are distinctive (Hendel 1928, Senior-White 1921) and the anepisternum has three setae (one medial and two posterior). It belongs in the *zeylanica* group and is known only from Sri Lanka.

### Species groups

The 102 described species of *Euphranta* are placed in the following 20 groups. Species preceded by an asterisk occur in the Australian Region (Australia, eastern Indonesia [Maluku and West Papua], Papua New Guinea, Solomon Islands, New Caledonia and Fiji).

*connexa* group

Wing with apical area largely brown, with no apical hyaline spot but a large indentation in cell m; thorax fulvous, usually with 2 broad dark vittae or 4 patches; anepisternum fulvous with a black longitudinal stripe; 2 or 3 frontal setae; acrostichal setae absent except in *palawanica*; R-M crossvein well beyond apex of pterostigma; oviscap moderately to very long; aculeus apically rounded and serrate. Known host plants Asclepiadaceae; a record of Curcubitaceae for *E. skinneri* (Hardy 1955) is likely to be a host misidentification. Europe to Japan and Philippines to West Papua, Indonesia.

Seven species: *E. connexa* (Fabricius, 1794); *E. flavorufa* Hering, 1936; *E. longicauda* Shiraki, 1952; *E. palawanica* Hardy, 1974; *E. skinneri* Hardy, 1955; *E. maxima* Hering, 1941; \**E. quadrimaculata* Hardy, 1983.

*chrysopila* group

Wing with a brown apical patch with no hyaline apical spot, a narrow subapical brown band across DM-Cu crossvein (except in *figurata*) and often with yellow areas; thorax black with yellow-white prescutellar spot or fulvous with black vittae; anepisternum yellow-white on upper or posterior parts; 2 frontal setae; acrostichal setae present or absent; R-M crossvein below apex of pterostigma; oviscap short. Known host plants Moraceae and Verbenaceae. Taiwan and Malaysia to Australia.

Seven species: *E. chrysopila* Hendel, 1913; *E. figurata* (Walker, 1856); *E. unifasciata* Hardy, 1981; *E. maculifrons* (de Meijere, 1914); \**E. quatei* Hardy, 1983; \**E. tricolor* Hardy, 1983; \**E. numeralis* Permkam & Hancock, 1995.

*macularis* group

Wing with a narrow costal/subapical band separated from pterostigma (vestigial in *lacteata*) and a large discal patch across DM-Cu crossvein; pterostigma short (about one third length of cell c); thorax brown to black; anepisternum fuscous; normally 3 frontal setae; acrostichal setae absent except in *furcifer*; R-M crossvein well beyond apex of pterostigma; abdomen black, narrow and elongate; aculeus short and broad, with large and small preapical dentations; spermathecae oval. Host plants unknown. India to Philippines and Indonesia (Maluku).

Three species: *E. macularis* (Wiedemann, 1830) [= *striatella* van der Wulp, 1891; = *nigra* Enderlein, 1911; = *nigra* Zia, 1965]; *E. lacteata* (van der Wulp, 1891); \**E. furcifer* (Walker, 1861).

*ocellata* group

Wing with a narrow costal/subapical band not separated from pterostigma and with or without a large discal patch across DM-Cu crossvein; pterostigma elongate (about equal in length to cell c); thorax brown to black; anepisternum fuscous; 3 frontal setae; acrostichal setae absent; R-M

crossvein below apex of pterostigma; aculeus short and broad, with a preapical dentation; spermathecae oval. Host plants unknown. Philippines.

Two species: *E. ocellata* Hardy, 1974; *E. stenopeza* Hardy, 1974.

#### *signatifacies* group

Wing usually with a curved hyaline band from cell  $r_1$  at apex of pterostigma to apex of cell dm and a transverse hyaline band in cell  $r_{2+3}$ , extending into cell  $r_{4+5}$  in *marina* and cell m in *transiens*; thorax red-brown to black with yellow postsutural vittae and large prescutellar spot; anepisternum with upper part usually yellow; 2 or 3 frontal setae; acrostichal setae absent; R-M crossvein below apex of pterostigma; oviscap short; aculeus sharply pointed without preapical dentations; spermathecae sausage shaped, with expanded ducts. Known host plants are mangroves (Verbenaceae). Southern Thailand to Papua New Guinea and Australia.

Three species: *E. signatifacies* Hardy, 1981; \**E. transiens* (Walker, 1860); \**E. marina* Permkam & Hancock, 1995.

#### *zeylanica* group

Wing with a hyaline apical spot and extensive brown discal areas; thorax red-brown; anepisternum without yellow areas; 3 frontal setae; acrostichal setae present; 3 anepisternal setae (1 medial and 2 posterior); R-M crossvein well beyond apex of pterostigma; oviscap long; aculeus elongate, smooth and sharply tapered or with 1 pair of weak preapical dentations; spermathecae thread-like, long and slender. Known host plants Annonaceae. Sri Lanka and India to Philippines, Australia, Solomon Islands and New Caledonia.

Seven species: *E. zeylanica* (Senior-White, 1921) [= *conjuncta* Hendel, 1928]; *E. notabilis* (van der Wulp, 1880) [= *canangae* Hardy, 1955]; *E. laosica* Hardy, 1973; *E. notata* Hardy, 1974; *E. tanyoura* Hardy, 1981; \**E. meringae* Permkam & Hancock, 1995; \**E. leichhardtiae* Permkam & Hancock, 1995.

#### *toxoneura* group

Wing usually with brown band through R-M crossvein directed towards medial part of cell  $r_1$  or broken with an isolated spot in cells  $r_1$ - $r_{2+3}$ , sometimes with pattern modified; subapical part of pterostigma and tip of cell  $r_1$  often hyaline and with a hyaline apical spot; thorax fulvous with 2 or 4 dark vittae or black; anepisternum fulvous or black, with or without narrow yellow band along upper margin; 3 frontal setae; acrostichal setae present except in *convergens*; R-M crossvein below to a little beyond apex of pterostigma; oviscap short; aculeus with 2 pairs of preapical dentations; spermathecae sausage shaped. Known hosts are fruit of Saxifragaceae, Staphyleaceae and Rosaceae, flowerheads of Paeoniaceae or sawfly galls on Salicaceae. North America, Europe to Japan, India and Thailand, Borneo and Indonesia to Papua New Guinea.

Sixteen species: *E. canadensis* (Loew, 1873); *E. mexicana* Norrbom, 1993; *E. toxoneura* (Loew, 1846); *E. ortalidina* (Portschinsky, 1892); *E. japonica* (Ito, 1947); *E. transmontana* (Ito, 1984); *E. jucunda* Hendel, 1915; *E. licenti* Zia, 1938; *E. nigrescens* (Zia, 1937); *E. convergens* Hardy, 1974; *E. nigripeda* (Bezzi, 1913); *E. maculifacies* Hardy, 1973; *E. turpiniae* Hancock & Drew, 1994; *E. maculipennis* Hardy, 1983; *E. incompleta* Hardy, 1983; \**E. sedlaceki* Hardy, 1983.

#### *mikado* group

Wing with a hyaline apical spot, brown band through R-M crossvein directed towards apex of pterostigma and pterostigma often pale medially; thorax fulvous to fuscous; anepisternum with or without a whitish band along upper margin, connected to postpronotal lobe; 3 frontal setae (2 in *perkinsi*); acrostichal setae present; R-M crossvein below apex of pterostigma; oviscap short; aculeus with 2 pairs of preapical dentations; spermathecae oval with expanded ducts. Known host plants Celastraceae and Rubiaceae. Eastern Russia and Japan to Burma, Borneo to Papua New Guinea and Australia.

Seven species: *E. mikado* (Matsumura, 1916); *E. oshimensis* Shiraki, 1933; *E. nigrocingulata* (Hering, 1938); *E. borneana* Hardy, 1983; \**E. perkinsi* Hardy, 1983; \**E. ternaria* Permkam & Hancock, 1995; \**E. mulgravea* Permkam & Hancock, 1995.

#### *lemniscata* group

Wing with a hyaline apical spot and a distinct V-shaped hyaline band from costa, interrupted in cells  $r_1+r_{2+3}$  by an isolated dark band, but without a hyaline indentation in the dark area in cell  $cu_2$ ; thorax red-brown, usually with 4 narrow or 2 broad black vittae, or black with yellow postsutural and medial vittae; anepisternum broadly yellow-white dorsally, connected narrowly with postpronotal lobe; 3 frontal setae; acrostichal setae present; R-M crossvein below apex of pterostigma; oviscap long; aculeus slender with subapical lobes and 3-4 pairs of preapical dentations. Known host plants Convolvulaceae. Taiwan to India, Australia, Fiji and New Caledonia.

Three species: *E. atrata* Hardy, 1974; \**E. lemniscata* (Enderlein, 1911) [= *rivulosa* Bezzi, 1928]; \**E. lemniscoides* Hancock & Drew, 2003.

#### *camelliae* group

Wing with brown band from pterostigma through R-M crossvein oblique, leaving apex of pterostigma hyaline; apex of cell  $r_1$  often with a small hyaline spot; hyaline apical spot of wing narrow; thorax brown to black with yellow prescutellar spot; anepisternum fuscous or with hind margin yellow; 3 frontal setae; acrostichal setae present; R-M crossvein just beyond apex of pterostigma; oviscap short; aculeus with 3 pairs of preapical dentations. Known host plants Meliaceae, Theaceae and Fagaceae. Japan and Korea to Thailand, Philippines and Indonesia.



Seven species: *E. camelliae* (Ito, 1949); *E. separata* (Ito, 1949); *E. sexsignata* Hendel, 1915; *E. corticicola* (Hering, 1952); *E. hainanensis* (Zia, 1955); *E. sabahensis* sp. n.; *E. ferenigra* Hardy, 1970.

#### *crux* group

Wing with a distinct dark band from pterostigma across R-M crossvein and a large hyaline apical spot; thorax fulvous to fuscous, often with a yellow prescutellar spot; anepisternum red-brown to black or with fore and hind margins yellow; 2 frontal setae; acrostichal setae present; R-M crossvein below apex of pterostigma; oviscap short; aculeus without preapical dentations but with a pair of subapical projections. Host plants unknown. India to Australia and Solomon Islands.

Seven species: *E. crux* (Fabricius, 1794); *E. dissoluta* (Bezzi, 1913); *E. burtoni* Hardy, 1973; \**E. bischofi* (Kertész, 1901); \**E. moluccensis* Hardy, 1983; \**E. minor* Hendel, 1928; \**E. isabellae* sp. n..

#### *apicalis* group

Wing with a large hyaline apical spot, an isolated brown basal band from pterostigma and band through R-M crossvein directed towards middle of cell  $r_1$ , sometimes interrupted; apex of pterostigma yellow; thorax black with fulvous medial and dorsolateral vittae; anepisternum black; 2 frontal setae; acrostichal setae present except in *naevifrons*; R-M crossvein well beyond apex of pterostigma; abdomen fuscous; oviscap short; aculeus short and bluntly pointed, without preapical dentations; spermathecae club shaped. Known host stems of Orobanchaceae. China to Burma, Philippines and Indonesia.

Four species: *E. scutellaris* (Chen, 1948); *E. suspiciosa* (Hering, 1938); *E. apicalis* Hendel, 1915; *E. naevifrons* Hering, 1941.

#### *cassiae* group

Wing with a hyaline apical spot; thorax black with a yellow-white prescutellar spot; anepisternum with a large dorsal yellow-white triangular spot; 2 frontal setae; acrostichal setae present; R-M crossvein below apex of pterostigma; oviscap short. Host plants Leguminosae, Solanaceae and Oleaceae. India and Thailand.

Three species: *E. cassiae* (Munro, 1938); *E. solaniferae* Hancock & Drew, 1994; *E. myxopyrae* Hancock & Drew, 1994.

#### *maculifemur* group

Wing with a short brown band from pterostigma, a broad preapical brown band and a large hyaline apical spot, the basal and preapical bands divergent; thorax black with a yellow-white presutural spot, darkened medially; postpronotal lobes black; anepisternum black; scutellum with large triangular basal black band; 2 frontal setae; acrostichal setae present (sometimes weak; absent in type of *flavizona*); R-M crossvein below middle of pterostigma;

abdominal tergite III fulvous, remainder black; oviscap short. Host plant unknown. Malaysia and Indonesia.

One species: *E. maculifemur* (de Meijere, 1924) [= *ormei* Hardy, 1973; = *flavizona* Hardy, 1983].

#### *linocierae* group

Wing with a relatively large hyaline apical spot and a broad preapical brown area; thorax fuscous with a large yellow-white prescutellar spot; anepisternum with yellow-white posterodorsal spot; fore basitarsus flattened in males except in *hardyi*; 2 frontal setae; acrostichal setae present; R-M crossvein below apex of pterostigma; oviscap short; aculeus tapering to a sharp point and with 1 pair of preapical dentations; spermathecae sausage shaped, with expanded ducts. Known host plants Oleaceae. Thailand and Philippines to Australia and New Caledonia.

Six species: *E. songkhla* Hancock & Drew, 1994 [= *maculifemur* of Hardy, not de Meijere]; *E. rudis* (Walker, 1856) [= *balteata* Hardy, 1981]; *\*E. brunneifemur* Hardy, 1983; *\*E. linocierae* Hardy, 1951; *\*E. solitaria* Hardy, 1983; *\*E. hardyi* Norrbom & Hancock, 2004.

#### *nigroapicalis* group

Wing with a relatively small hyaline apical spot and a broad preapical brown area; thorax fuscous with a large yellow-white prescutellar spot; anepisternum entirely dark; 2 frontal setae; acrostichal setae present; R-M crossvein below apex of pterostigma; oviscap short; aculeus with 2 pairs of preapical dentations; spermathecae ribbon-like, with expanded ducts. Known host plant Xanthophyllaceae. Papua New Guinea and Australia.

Two species: *\*E. nigroapicalis* Hardy, 1983; *\*E. athertonis* Permkam & Hancock, 1995.

#### *basalis* group

Wing with a short brown band from pterostigma, a broad preapical brown band and a moderate to large hyaline apical spot; thorax fulvous, often with narrow dorsolateral black vittae, to fuscous, with or without a yellow prescutellar area; anepisternum without distinct yellow areas; normally 2 frontal setae; acrostichal setae absent; R-M crossvein before or below apex of pterostigma; fore femora often with a brown subapical spot; oviscap short; aculeus with 1 pair of preapical dentations; spermathecae club-shaped. Host plants unknown. Philippines and Brunei to Australia and Solomon Islands.

Eight species: *E. flavoscutellata* Hardy, 1970; *E. belalongensis* Chua, 2000; *\*E. latifasciata* Hardy, 1983; *\*E. basalis* (Walker, 1865); *\*E. pallida* Hardy, 1983; *\*E. simonthomasi* Hardy, 1983; *\*E. variabilis* (Kertész, 1901); *\*E. bimaculata* (Malloch, 1939).

*bilineata* group

Wing with brown pterostigma, a broad preapical brown band enclosing both R-M and DM-Cu crossveins and a small hyaline apical spot; thorax fulvous with narrow black vittae; anepisternum fulvous; 2 frontal setae; acrostichal and postpronotal setae absent; R-M crossvein well beyond apex of pterostigma, near apex of cell dm; abdomen rufous; oviscapae short. Host plant unknown. Papua New Guinea.

One species: \**E. bilineata* Hardy, 1983.

*scutellata* group

Wing often largely fuscous, with or without a hyaline band or indentation beyond apex of pterostigma; hyaline apical spot often reduced; thorax black with a large yellow-white prescutellar spot; anepisternum black or with a grey or yellow posterior band; 2 frontal setae; acrostichal setae absent; R-M crossvein below apex of pterostigma; fore femora with a brown subapical spot; oviscapae short; aculeus with 1 large and 2 small pairs of preapical dentations; spermathecae sausage shaped, with expanded ducts. Known host plants Apocynaceae. Southern Thailand to Solomon Islands.

Six species: *E. cerberae* Hancock & Drew, 1995; \**E. ochrosiae* Hancock & Drew, 2003; \**E. vitabilis* Hardy, 1970; \**E. fuscata* sp. n.; \**E. betikamae* sp. n.; \**E. scutellata* Malloch, 1939.

*mediofusca* group

Wing with costal margin largely hyaline and a broad brown discal area or with a brown costal band, narrow band over R-M crossvein and large patch over DM-Cu crossvein; thorax mostly red-brown or fuscous with an indistinct yellow prescutellar area; anepisternum with or without a yellow dorsal patch; 2 frontal setae; acrostichal setae present; R-M crossvein below apex of pterostigma; fore femora with a brown subapical spot; oviscapae short. Host plants Verbenaceae and Loganiaceae. Papua New Guinea and Australia.

Two species: \**E. mediofusca* (Hering, 1941); \**E. marginata* Hardy, 1983.

**Host plants**

Host plant records are available for 34 *Euphranta* species (Table 1), derived largely from Shiraki (1933), Hardy (1955, 1983), Korneyev (1990), Norrbom (1993), Merz (1994), Hancock and Drew (1994, 1995, 2003) and Permkam and Hancock (1995). Most species are fruit or pod infesters but *E. apicalis* breeds in stems of *Aeginetia indica* (Orobanchaceae) (Shiraki 1933), *E. ortalidina* breeds in flowerheads of *Paeonia* sp. (Paeoniaceae) (Korneyev 1990) and *E. toxoneura* is a brood parasite in larval galls of *Pontania* spp. (Hymenoptera) on *Salix* sp. (Salicaceae) (Kopelke 1984). *E. chrysopila* has been collected on, but not yet reared from, stems of *Bambusa* (Poaceae: bamboo) in Taiwan (Shiraki 1933). The record of 'Cucurbitaceae' as a host for *E. skinneri* in the Philippines (Hardy 1955, 1974) is almost certainly a

misidentification of Asclepiadaceae, the pods of which are often confused with cucurbits. A record of a single specimen of *E. corticicola* bred from fruit of *Turpinia pomifera* (Staphyleaceae) (Hancock and Drew 1994) is likely to be a sampling error.

**Table 1.** Recorded host plants of *Euphranta* spp.

<i>Euphranta</i> sp.	Host plants
<i>E. connexa</i>	Asclepiadaceae - <i>Vincetoxicum hirundinaria</i> fruit
<i>E. flavorufa</i>	Asclepiadaceae - <i>Metaplexis japonica</i> fruit
<i>E. longicauda</i>	Asclepiadaceae - <i>Marsdenia tomentosa</i> fruit
<i>E. skinneri</i>	'Cucurbitaceae' - ? misident. Asclepiadaceae
<i>E. numeralis</i>	Moraceae - <i>Maclura cochinchinensis</i> fruit (1 specimen)
<i>E. quatei</i>	Verbenaceae - <i>Gmelina moluccana</i> fruit
<i>E. marina</i>	Verbenaceae - <i>Avicennia marina</i> fruit
<i>E. signatificies</i>	Verbenaceae - <i>Avicennia officinalis</i> fruit
	Rhizophoraceae - <i>Rhizophora mucronata</i> fruit (1 record)
<i>E. notabilis</i>	Annonaceae - <i>Cananga odorata</i> fruit
<i>E. leichhardtiae</i>	Annonaceae - <i>Rauwenhoffia leichhardtii</i> fruit
<i>E. canadensis</i>	Saxifragaceae - <i>Ribes</i> spp. fruit
<i>E. mexicana</i>	Saxifragaceae - <i>Ribes pringlei</i> fruit
<i>E. toxoneura</i>	<i>Pontania</i> spp. sawfly larvae in galls on <i>Salix</i> (Salicaceae)
<i>E. japonica</i>	Rosaceae - <i>Prunus avium</i> fruit
<i>E. ortalidina</i>	Paeoniaceae - <i>Paeonia</i> sp. flowerhead
<i>E. turpiniae</i>	Staphyleaceae - <i>Turpinia pomifera</i> fruit
<i>E. oshimensis</i>	Celastraceae - <i>Euonymus maackii</i> fruit
<i>E. perkinsi</i>	Rubiaceae - <i>Morinda bracteata</i> fruit
<i>E. lemniscata</i>	Convolvulaceae - <i>Stictocardia tiliifolia</i> fruit
<i>E. lemniscoides</i>	Convolvulaceae - <i>Merremia peltata</i> fruit
<i>E. camelliae</i>	Theaceae - <i>Camellia japonica</i> seed
	Fagaceae - <i>Castanea crenata</i> seed
<i>E. corticicola</i>	Meliaceae - <i>Dysoxylum binectariferum</i> fruit
<i>E. apicalis</i>	Orobanchaceae - <i>Aeginetia indica</i> stems
<i>E. cassiae</i>	Leguminosae - <i>Cassia fistula</i> pods
<i>E. solaniferae</i>	Solanaceae - <i>Solanum trilobatum</i> fruit (1 record)
<i>E. myxopyrae</i>	Oleaceae - <i>Myxopyrum smilacifolium</i> fruit
<i>E. linocierae</i>	Oleaceae - <i>Chionanthus ramiflorus</i> seed
<i>E. songkhla</i>	Oleaceae - <i>Chionanthus ramiflorus</i> fruit or seed
<i>E. nigroapicalis</i>	Xanthophyllaceae - <i>Xanthophyllum</i> sp. fruit ?
<i>E. cerberae</i>	Apocynaceae - <i>Cerbera odollam</i> fruit
<i>E. ochrosiae</i>	Apocynaceae - <i>Ochrosia marginata</i> fruit
<i>E. scutellata</i>	Apocynaceae - <i>Cerbera manghas</i> fruit
<i>E. mediofusca</i>	Verbenaceae - <i>Faradaya splendida</i> fruit
<i>E. marginata</i>	Loganiaceae - <i>Neuburgia corynocarpa</i> fruit



## Discussion

From an analysis of the above species groups it is evident that the presence or absence of prescutellar acrostichal or katepisternal setae cannot be used to define subgenera within *Euphranta*. In some cases the variation is intraspecific. The relative lengths of the pterostigma and arisal plumosity, number of frontal setae, position of R-M crossvein and presence or absence of distinct fore femoral setae or a hyaline apex to wing cell  $r_{4+5}$  are also subject to intergradation and are similarly inapplicable at subgeneric level. Consequently, the names *Rhacochlaena* Loew, *Epochra* Loew, *Macrotrypeta* Portschinsky, *Lagarosia* van der Wulp, *Staurella* Bezzi, *Xanthotrypeta* Malloch and *Paraeuphranta* Hardy are all regarded as synonyms of *Euphranta*, with no subgenera recognisable. However, further study may show that the *macularis* group, with its very short pterostigma and narrow, elongate abdomen, may be separable at the generic or subgeneric level, for which the name *Lagarosia* (= *Paraeuphranta*) is available.

An additional, undescribed species, close to *E. chrysopila* but with more extensively marked wings, is known from Sri Lanka (1 female, Alntoya, 22.iv.[18]91, Lt Col. Yerbury, 1892-192, in BMNH).

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